ANT-LX Series Stage
User's Manual

P/N: EDS128 (Revision 1.02.00)

Dedicated to the Science of Motion
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Chapter 1: Overview

This chapter introduces standard and optional features of the ANT-LX stages, explains the model numbering system, and gives general safety precautions. Figure 1-1 shows typical ANT-LX positioning stages.

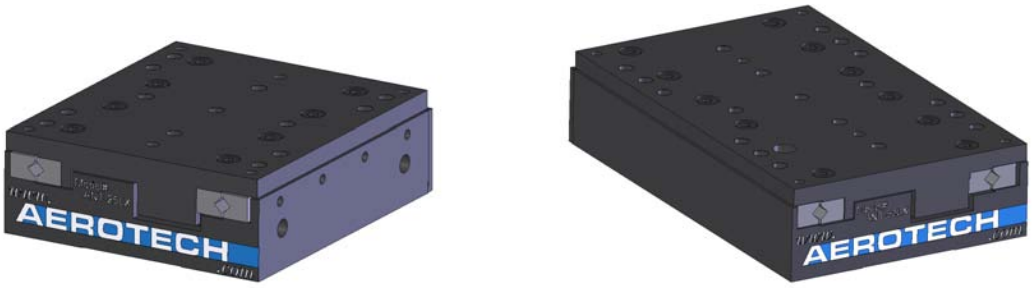

Figure 1-1: ANT-25LX and ANT-50LX Linear Positioning Stage

NOTE: Aerotech continually improves its product offerings, and listed options may be superseded at any time. Refer to the most recent edition of the Aerotech Motion Control Product Guide for the most current product information at www.aerotech.com.

1.1. Standard Features

The ANT-LX is a compact, high-performance stage for use in applications where a small footprint is required. The linear motor is completely cog-free, allowing for extremely tight velocity control.

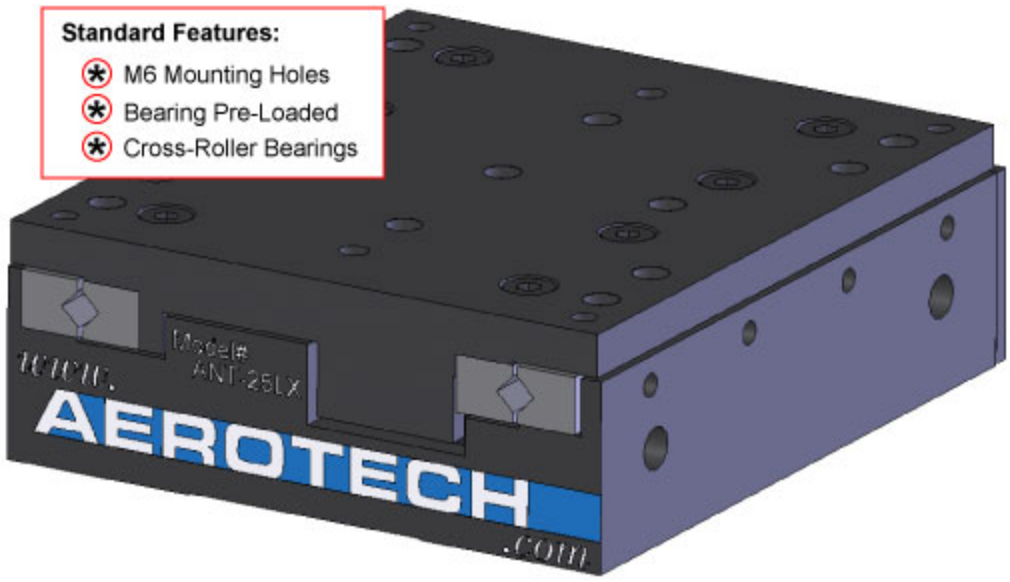

Figure 1-2: Typical ANT-LX Stage

1.1.1. Optional Features

The ANT-LX stages are designed to be easily joined together in an X-Y configuration. Reamed holes for 4mm dowel pins are provided on the base and carriage top to allow the stages to be aligned perpendicularly quickly and conveniently. Precision Alignments can also be performed by Aerotech if required. A mounting plate, available from Aerotech, is required to use the ANT-50LX as the top (Y-axis) stage in an X-Y configuration. Custom configurations, such as X-Y-Z systems are common and readily available. Contact Aerotech for more details on optional features and configurations.

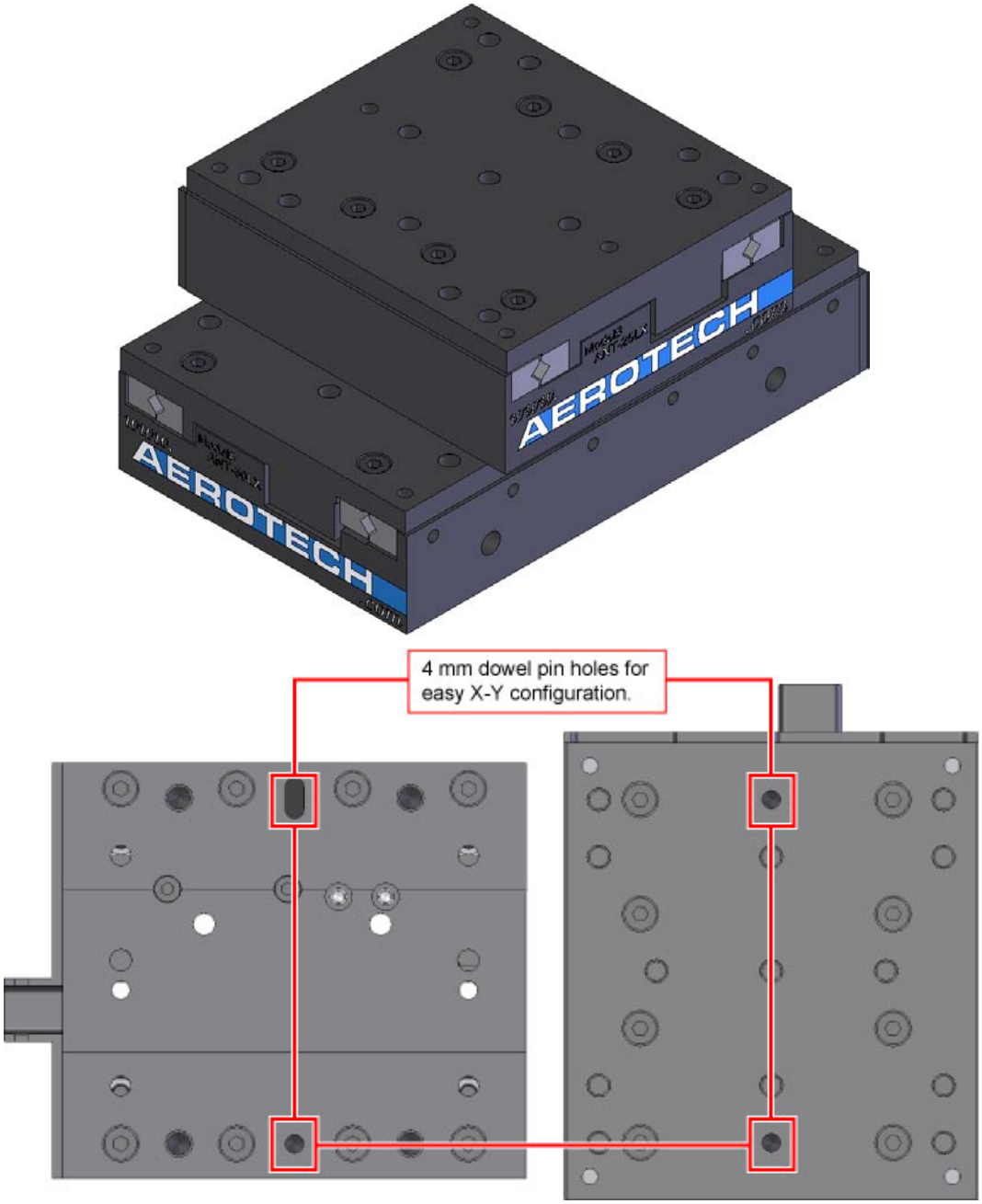

Figure 1-3: ANT-LX X-Y Configuration

1.1.2. Model Numbers

The stage model number indicates the optional features on a particular stage. To determine the options on your stage, refer to Table 1-1 for an explanation of the numbering system.

Table 1-1: Model Numbering System

ANT-LX Series Linear Motor Stage	
-25LX	25 mm (1 in) travel stage with linear motor and limits
-50LX	50 mm (2 in) travel stage with linear motor and limits
Limits	
-NC	Normally-closed end of travel limit switches (standard)
Accessories (to be ordered as separate line item)	
ALIGNMENT-NPA	Non-precision XY assembly
ALIGNMENT-PA10	XY assembly; 10 arc sec orthogonal
ALIGNMENT-PA5	XY assembly; 5 arc sec orthogonal
HALAR	High-accuracy system, linear error correction for accuracy and repeatability
MXH5-D-mm*	External 20-times multiplier; 32 MHz maximum data rate, 1.0 um resolution (LTAS)
MXH10-D-mm*	External 40-times multiplier; 32 MHz maximum data rate, 0.5 um resolution (LTAS)
MXH25-D-mm*	External 100-times multiplier; 32 MHz maximum data rate, 0.2 um resolution (LTAS)
MXH50-D-mm*	External 200-times multiplier; 32 MHz maximum data rate, 0.1 um resolution (LTAS)
MXH100-D-mm*	External 400-times multiplier; 32 MHz maximum data rate, 0.05 um resolution (LTAS)
MXH200-D-mm*	External 800-times multiplier; 32 MHz maximum data rate, 0.025 um resolution (LTAS)
MXH250-D-mm*	External 1000-times multiplier; 32 MHz maximum data rate, 0.02 um resolution (LTAS)
MXH500-D-mm*	External 2000-times multiplier; 32 MHz maximum data rate, 0.01 um resolution (LTAS)
MXC-nn	Multiplier to controller cable; specify length '-nn' in feet
* Specify data rate "mm" 2M = 2MHz, 4M = 4MHz, 8M = 8MHz, 16M = 16MHz, 32M = 32MHz	

NOTE: Internal signal multipliers available with A3200 amplifier products.

1.2. Dimensions

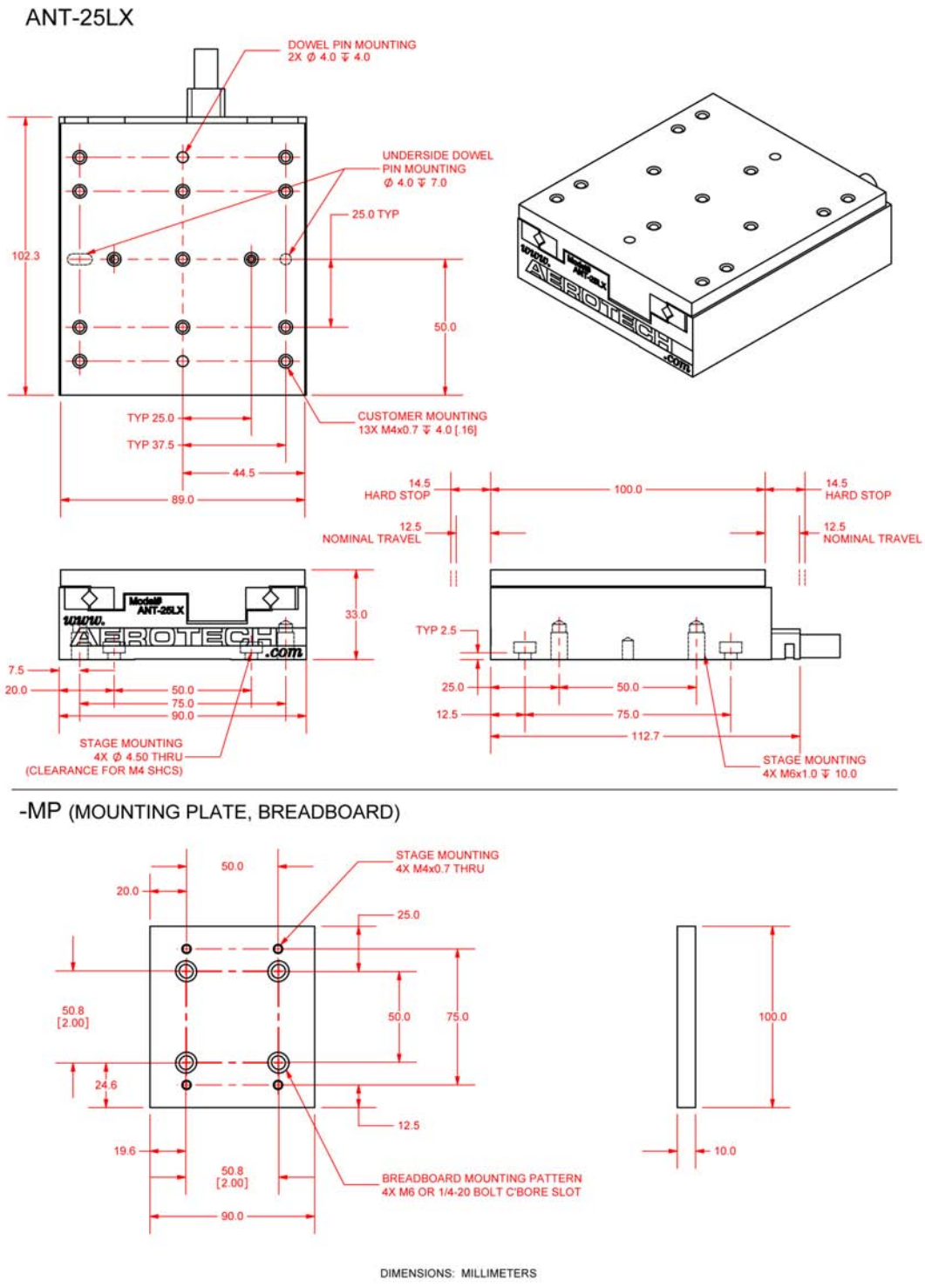

Figure 1-4: ANT-25LX Dimensions

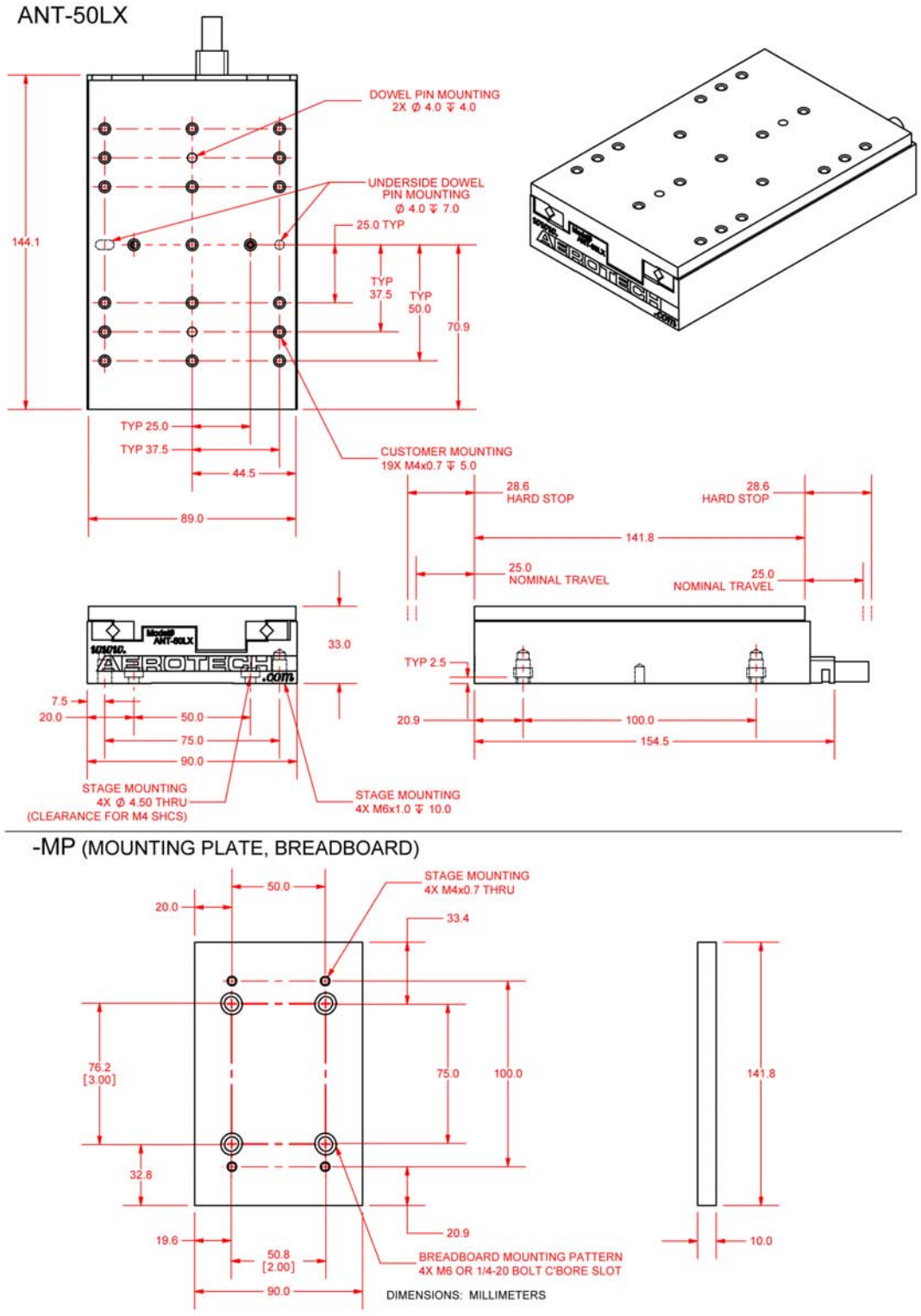

Figure 1-5: ANT-50LX Dimensions

1.3. Safety Procedures and Warnings

The following statements apply throughout this manual. Failure to observe these precautions could result in serious injury to those performing the procedures and damage to the equipment.

This manual and any additional instructions included with the stage should be retained for the lifetime of the stage.

	To minimize the possibility of electrical shock and bodily injury or death, disconnect all electrical power prior to making any electrical connections.
	To minimize the possibility of electrical shock and bodily injury or death when any electrical circuit is in use, ensure that no person comes in contact with the circuitry when the stage is connected to a power source.
	To minimize the possibility of bodily injury or death, disconnect all electrical power prior to making any mechanical adjustments.
	Moving parts of the stage can cause crushing or shearing injuries. All personnel must remain clear of any moving parts.
	Improper use of the stage can cause damage, shock, injury, or death. Read and understand this manual before operating the stage.
	If the stage is used in a manner not specified by the manufacturer, the protection provided by the stage can be impaired.
	Stage cables can pose a tripping hazard. Securely mount and position all stage cables to avoid potential hazards.

	Do not expose the stage to environments or conditions outside the specified range of operating environments. Operation in conditions other than those specified can cause damage to the equipment.
	The stage must be mounted securely. Improper mounting can result in injury and damage to the equipment.
	Use care when moving the stage. Manually lifting or transporting stages can result in injury.
	Only trained personnel should operate, inspect, and maintain the stage.
	This stage is intended for light industrial manufacturing or laboratory use. Use of the stage for unintended applications can result in injury and damage to the equipment.
	Before using this stage, perform an operator risk assessment to determine the needed safety requirements.

1.4. EC Declaration of Incorporation

Manufactorer: Aerotech, Inc.
101 Zeta Drive
Pittsburgh, PA 15238
USA

herewith declares that the product:
Aerotech, Inc. ANT-LX Stage
is intended to be incorporated into machinery to constitute machinery covered by the Directive 2006/42/EC as amended;

does therefore not in every respect comply with the provisions of this directive;

and that the following harmonized European standards have been applied:
EN ISO 12100-1,-2:2003+A1:2009
Safety of machinery - Basic concepts, general principles for design
ISO 14121-1:2007
Safety of machinery - Risk assessment - Par 1: Principles
EN 60204-1:2005
Safety of machinery - Electrical equipment of machines - Part 1: General requirements
and further more declares that
it is not allowed to put the equipment into service until the machinery into which it is to be incorporated or of which it is to be a component has been found and declared to be in conformity with the provisions of the Directive 2006/42/EC and with national implementing legislation, i.e. as a whole, including the equipment referred to in this Declaration.

Authorized Representative: Manfred Besold
Address: AEROTECH GmbH
Süd-West-Park 90
D-90449 Nürnberg

Name: Alex Weibel /
Position: Engineer Verifying Compliance
Location: Pittsburgh, PA
Date: November 5, 2010

Chapter 2: Installation

This chapter describes the installation procedure for the ANT-LX stage, including handling the stage properly, preparing the mounting surface to accept the stage, securing the stage to the mounting surface, attaching the payload, and making the electrical connections.

Installation must follow the instructions in this chapter. Failure to follow these instructions could result in injury and damage to the equipment.

2.1. Unpacking and Handling the Stage

Carefully remove the stage from the protective shipping container. Set the stage on a smooth, flat, and clean surface. Before operating the stage, it is important to let the stage stabilize at room temperature.

All ANT-LX series stages are packaged with a shipping clamp installed to prevent stage table movement. These are red anodized brackets that bolt the stage table to the base. These must be removed before the stage table can be moved.

Each stage has a label listing the system part number and serial number. These numbers contain information necessary for maintaining or updating system hardware and software. Locate this label and record the information for later reference. If any damage has occurred during shipping, report it immediately.

Figure 2-1: Shipping Clamps on ANT-25LX

Improper stage handling could adversely affect the stage's performance. Use care when moving the stage. Lift the stage only by the base. Do not use the stage table as a lifting point.

2.2. Preparing the Mounting Surface

The mounting surface should be flat and have adequate stiffness in order to achieve the maximum performance from the stage. When an ANT-LX series stage is mounted to a non-flat surface, the stage can be distorted as the mounting screws are tightened (see Figure 2-2 and Figure 2-3).

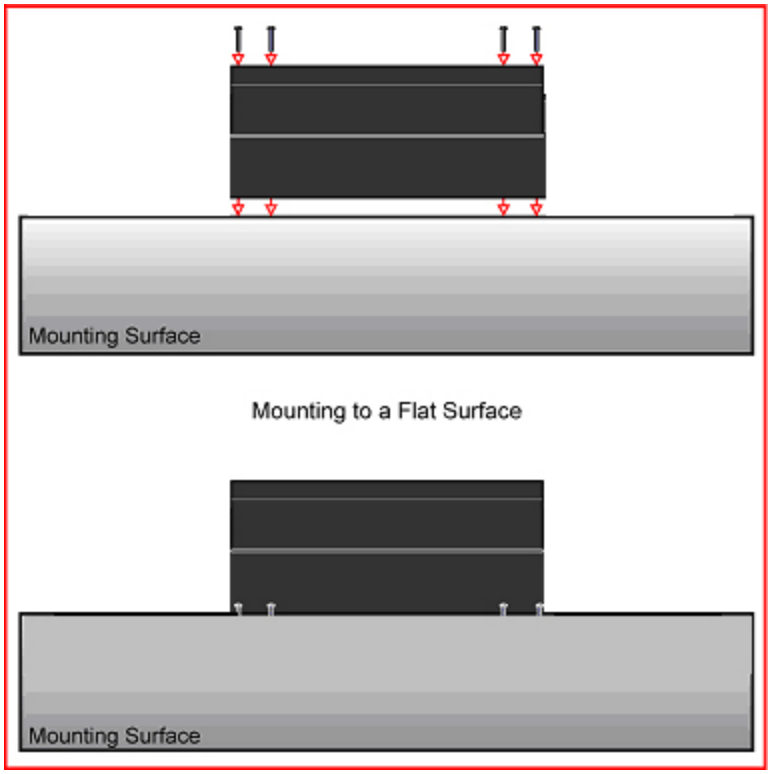

Figure 2-2: Mounting to a Flat Surface

NOTE: To maintain accuracy, the mounting surface should be flat within 1 µm per 50 mm.

Any distortion will decrease the overall accuracy of the stage. Adjustments to the mounting surface must be done before the stage is secured (see Figure 2-3).

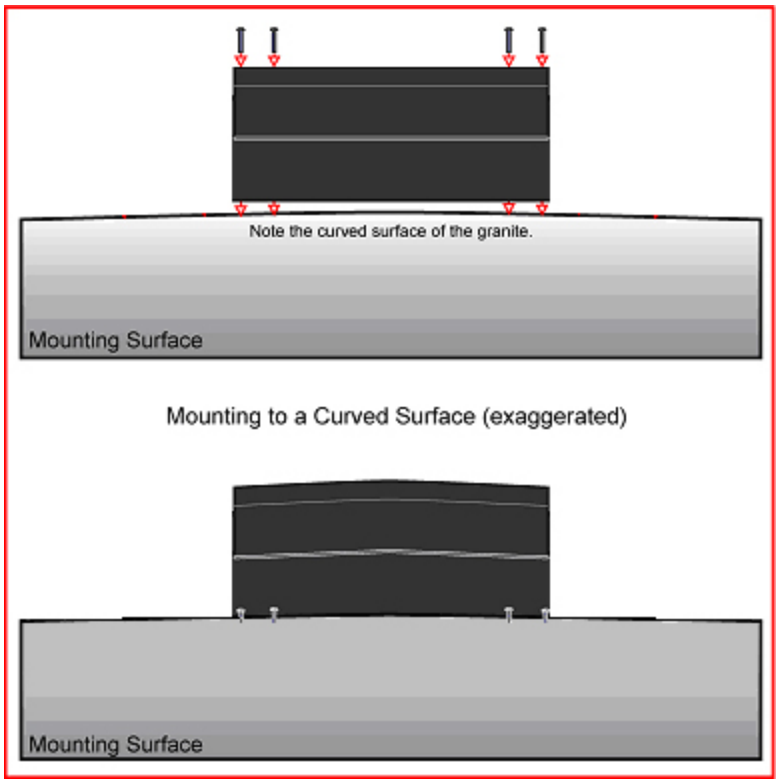

Figure 2-3: Mounting to a Curved Surface

NOTE: The stage base is precision machined and verified for flatness prior to stage assembly at the factory. If machining is required to achieve the desired flatness, it should be performed on the mounting surface rather than the stage base. Shimming should be avoided if possible. If shimming is required, it should be minimized to improve the rigidity of the system.

2.3. Securing the Stage to the Mounting Surface

To access the mounting holes of the ANT-LX stage, slide the tabletop all the way to either end of travel as shown in Figure 2-4. The stage is designed to use four M4 by 8 mm long or #8 by 3/8 in long socket head cap screws (SHCS) to secure it to the mounting surface. For X-Y configurations, the upper stage should mount to the tabletop of the lower stage with M4 by 6 mm long SHCS. A mounting plate is necessary if an ANT-50LX is used as the upper axis. Torque the mounting screws to 2.3 N-m (20 in-lb). The ANT-LX stages also have four M6X1.0 by 10 mm deep threaded holes in the base for mounting if desired. If used, M6 screws should be tightened to 8 N-m or 71 in-lb.

The stage must be mounted securely. Improper mounting can result in injury and damage to the equipment.

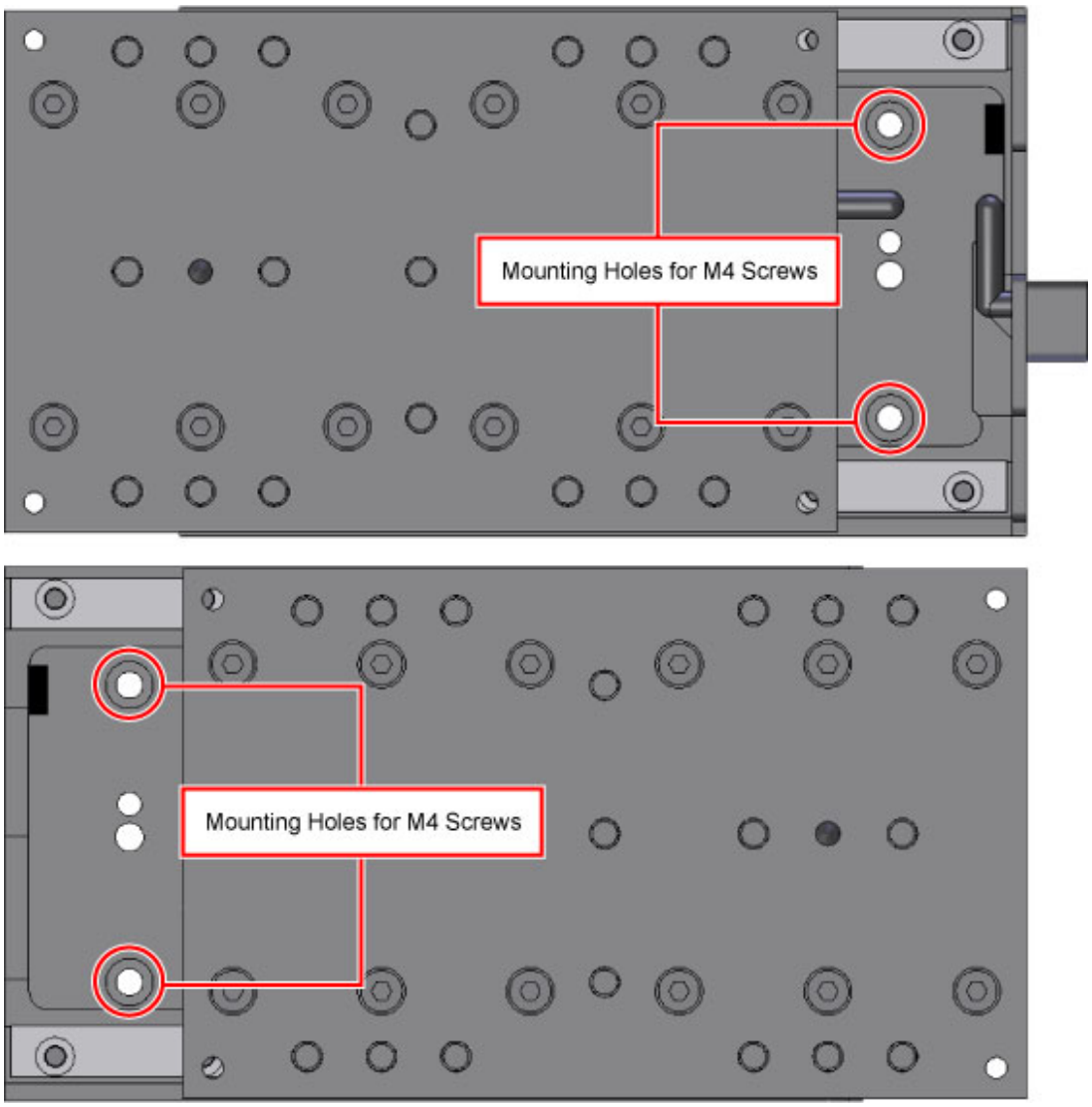

Figure 2-4: Mounting Hole Locations

2.4. Attaching the Payload to the Stage

To prevent damage to payloads, test the operation of the stage before the payload is attached to the stage table. Proceed with the electrical installation and test the motion control system in accordance with the system documentation. Document all results for future reference. For information on electrical connections, refer to Section 2.5.

The payload should be flat, rigid, and comparable to the stage in quality.

NOTE: For valid system performance, the mounting interface should be flat within 10 µm.

Refer to Section 3.4. for information on cantilevered loads and load positioning.

Do not attach a payload to the stage table with screws that are too long. A screw passing through the stage table can come into contact with moving parts, affecting travel and possibly damaging the stage.

2.5. Electrical Installation

Aerotech motion control systems are adjusted at the factory for optimum performance. When the ANT-LX series stage is part of a complete Aerotech motion control system, setup involves connecting a stage to the appropriate drive chassis with the cable provided. Connect the provided cable to the 25 pin connector on the stage. Labels on the drive components indicate the appropriate connections. Refer to your drive manuals and documentation for additional installation and operation information. In some cases, if the system is uniquely configured, a drawing showing system interconnects is supplied.

An integral linear motor comes mounted to all ANT-LX stages. The electrical wiring from the motor and encoder are integrated into two main connectors at the factory. Refer to Section 3.6. for standard motor wiring and connector pin outputs.

Never connect or disconnect any electrical component or connecting cable while power is applied, or serious damage may result.

The stage's protective ground is located on pin 10 and 22 of the stage's 25 pin connector. If you are using cables other than those provided by Aerotech, you must connect pin 10 and 22 to a ground connection.

Chapter 3: Operating Specifications

The surrounding environment and operating conditions can affect the performance and service life of the stage. This chapter provides information on ideal environmental and operating conditions. Also included are instructions for estimating load capability given various loading situations.

3.1. Environmental Specifications

The environmental specifications for the ANT-LX are listed in the following table.

Table 3-1: Environmental Specifications

Ambient Temperature	Operating: 10° to 35° C (50° to 95° F) The optimal operating temperature is 20° C ±2° C (68° F ±4° F). If at any time the operating temperature deviates from 20° C degradation in performance could occur. Contact Aerotech for information regarding your specific application and environment.
	Storage: 0° to 40° C (32° to 104° F) in original shipping packaging
Humidity	Operating: 40 percent to 60 percent RH The optimal operating humidity is 50 percent RH.
	Storage: 30 percent to 60 percent RH, non-condensing in original packaging
Altitude	Operating: 0 to 2,000 m (0 to 6,562 ft) above sea level Contact Aerotech if your specific application involves use above 2,000 m or below sea level.
Vibration	Use the system in a low vibration environment. Excessive floor or acoustical vibration can affect stage and system performance. Contact Aerotech for information regarding your specific application.
Dust Exposure	The ANT-LX stages are not suited for dusty or wet environments. This equates to an ingress protection rating of IP00.
Use	Indoor use only

Do not expose the stage to environments or conditions outside the specified range of operating environments. Operation in conditions other than those specified can cause damage to the equipment.

3.2. Accuracy and Temperature Effects

The accuracy specification of ANT-LX series stages is measured at the center of travel 25 mm above the table with the stage in a horizontal position.

Aerotech stages are designed for and built in a 20ºC (68ºF) environment. The linear encoder scale is mounted to aluminum with a thermal expansion coefficient of 24.3 µm/m-ºC, and any deviation from standard operating temperature will change the scale length accordingly; changing stage accuracy specifications. The severity of temperature effects on all stage specifications depends on many different environmental conditions, including how the stage is mounted. Contact the factory for more details.

3.3. Basic Specifications

Basic ANT-LX series positioning stage specifications are shown in Table 3-2.

Table 3-2: ANT-LX Series Specifications

Basic Model		ANT-25LX	ANT-50LX
Total Travel		25 mm (1 in)	50 mm (2 in)
Drive System		Linear Brushless Servomotor	
Bus Voltage		up to 80 VDC	
Continuous Current	Apk	up to 3.1 A	up to 2.9 A
	Arms	up to 2.2 A	up to 2.1 A
BEMF, line-line, max.	V/m/sec	2.86	3.78
	V/in/sec	0.073	0.096
Force Constant, Sinusoidal Drive	N/A (lb/A), pk	2.48 (0.56)	3.29 (0.74)
	NA (lb/A), rms	3.51 (0.79)	4.65 (1.04)
Resistance, 25 C, line-line	Ohms	4	5.2
Resistance, 125 C, line-line	Ohms	5.6	7.28
Inductance, line-line	mH	0.51	0.70
Magnetic Pole Pitch	mm (inch)	16 (0.63)	
Feedback		Noncontact Linear Encoder	
Resolution		0.0025 µm - 1 µm (0.1 µin - 40 µin)	
Maximum Travel Speed(1)		500 mm/s (8 in/s)	
Maximum Linear Acceleration		5 g - 50 m/s2 (no load)	
Maximum Load(2)	Horizontal	8.0 kg (18 lb)	
	Side	5.0 kg (11 lb)	
Accuracy	Standard	±3.0 µm (±120 µin)	
	HALAR(3)	±0.3 µm (±12 µin)	
Repeatability	Standard	±0.1 µm (±4 µin)	
	HALAR(3)	±0.05 µm (±2 µin)	
Straightness and Flatness	Differential	3.0 µm/25 mm (120 µin/in)	
	Max Deviation	±1.5 µm (±60 µin)	±2.0 µm (±80 µin)
Pitch and Yaw		5 arc sec	
Nominal Stage Weight		0.8 kg (1.8 lb)	1.2 kg (2.7 lb)
Moving Mass		0.46 kg (1.0 lb)	0.52 kg (1.1 lb)
Construction		Aluminum Body / Black Anodize Finish / Hardcoat	

(1) Maximum speed based on stage capability; maximum application velocity may be limited by system data rate and system resolution.

(2) Maximum load based on bearing capability; maximum application load may be limited by acceleration requirements.

(3) Available with Aerotech controllers

3.4. Load Capability

Application loads should be symmetrically distributed whenever possible (i.e., the payload should be centered on the stage table and the entire stage should be centered on the support structure). With the stage lying flat (horizontal) and the application load vertically applied and symmetrically distributed, the maximum vertical load carrying capacity of ANT-LX stages is 8.0 kg. 3.4 and Figure 3-3 show the rated loading for the -25LX and -50LX stages, respectively, for various cantilever distances and application forces. Figure 3-1 depicts the three loading conditions used in the 3.4 and Figure 3-3.

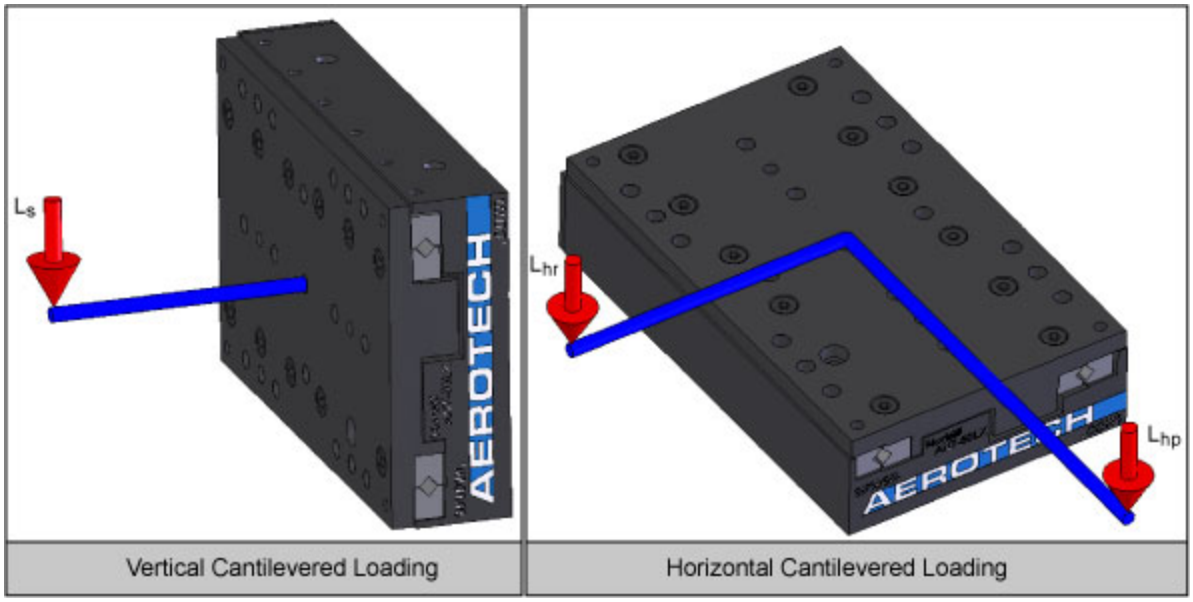

Figure 3-1: Stage Orientations for L_{hr}, L_{hp}, and L_s

In 3.4 and Figure 3-3, three curves are shown for different loading conditions. The Lhr curve is for situations where the stage is mounted in a horizontal orientation and the payload is mounted to the table top so that it will cause roll forces. The Lhp curve assumes a horizontal stage orientation under a pitch loading. The L_s curve assumes a vertical mounting with the side of the stage parallel to the ground and loads positioned at a distance outward from the tabletop, causing roll forces.

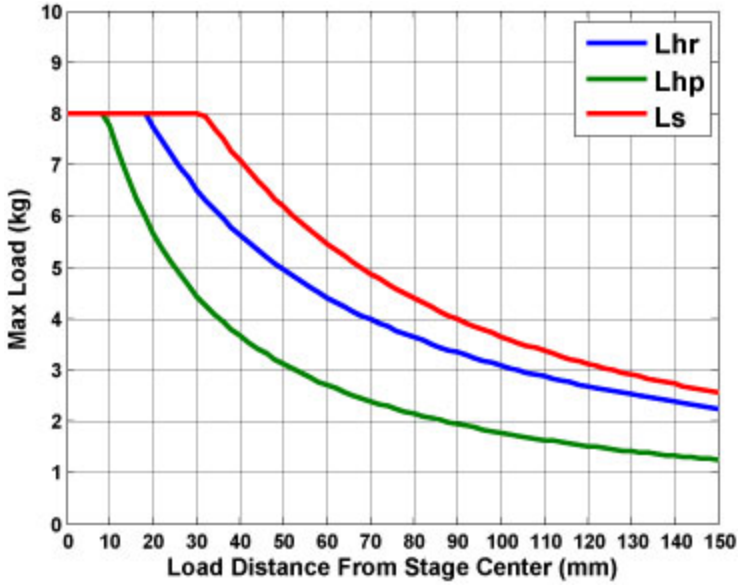

Figure 3-2: Load Capability of ANT-25LX Stage

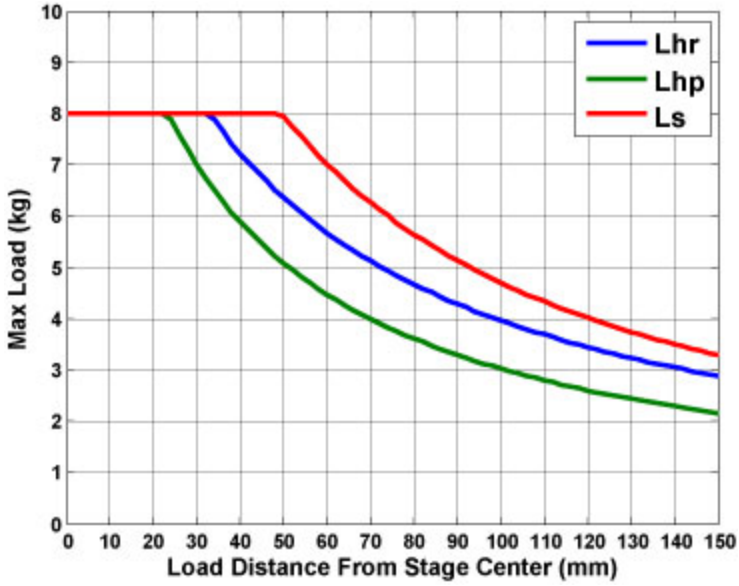

Figure 3-3: Load Capability of ANT-50LX Stage

3.5. Magnetic Actuator Limit

3.5.1. Actuator Limit Operation

ANT-LX series stages are provided with a Hall-effect limit switch. The limit switch signals when the stage has reached its maximum useable travel distance in either direction. The limit switch is mounted to a small circuit board within the stage and two magnets, used as triggers, are mounted to the bottom of the stage table.

If the stage is driven beyond the electrical limit, it will encounter the mechanical stop. Although the operating speed of the stage may be relatively slow, damage to the stage could result.

3.5.2. Limit Switch Wiring

The limit switch is mounted on a small printed circuit board. Standard ANT-LX stages include limit switch wiring integrated into the main wiring connector. Limit switches on

ANT-LX stages are configured normally-closed. The input to the controller is seen as a logic 0 (typical 0.4 V @ 12.8 mA) when no limit condition is present. When the limit switch is activated, a 5 V source through a pull-up resistor causes a logic 1 (typically 4.8-5 V) to be seen by the controller input.

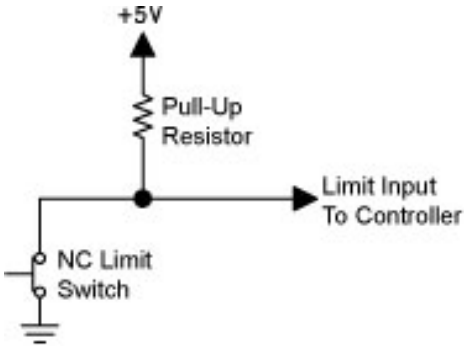

Figure 3-4: Limit Switch Wiring

3.6. Standard Motor Wiring

Stages fitted with standard motors and encoders come from the factory completely wired and assembled. For reference, connector pin assignments and general wiring information is given in Table 3-3.

NOTE: Refer to the other documentation accompanying your Aerotech equipment. Call your Aerotech representative if there are any questions on system configuration.

NOTE: If you are using your own cables to connect the stage, ensure that motor and ground wires can handle current higher than the continuous current listed in Table 3-2. The voltage rating of the wire insulation must be greater than the bus voltage listed in Table 3-2.

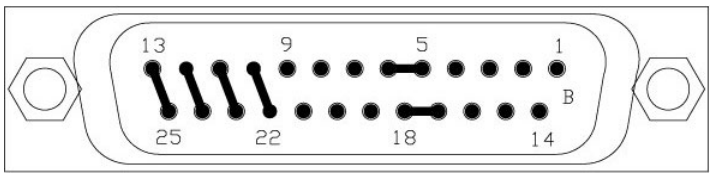

Table 3-3: Feedback and Motor Connector Pin Assignments

Pin	Label	Description
1	KEYED	Connector has key to prevent improper connection
2	COS-N	Incremental encoder output. Complement of cos.
3	SIN-N	Incremental encoder output. Complement of sin.
4	MKR-N	Incremental encoder output; either the complement of Marker with a line driven, TTL type encoder or 2.5 VDC bias level with amplified sine wave type encoder.
5	COM	Common ground for feedback connector wiring
6	COM	Common ground for feedback connector wiring
7	-LMT	Active high signal indicating stage maximum travel produced by negative stage direction.
8	HALL A	Hall Effect A. Brushless motor commutation track output.
9	HALL C	Hall Effect C. Brushless motor commutation track output.
10	FRM GND	Motor common ground
11	MTR ØA	Motor Phase A
12	MTR ØB	Motor Phase B
13	MTR ØC	Motor Phase C
14	COS	Cosine. Incremental encoder output; either TTL line driven or amplified sine wave type signal.
15	SIN	Sine. Incremental encoder output; either TTL line driven or amplified sign wave type signal.
16	MKR	Marker
17	ENC +5V	+5 V supply input for optical encoders. Typical requirement is 250 mA.
18	LMT +5V	+ 5 V supply input for optical limit switch boards. Typical requirement is 50 mA.
19	+LMT	Active high signal indicating maximum travel produced by positive stage direction.
20	HM LMT	
21	HALL B	Hall Effect B. Brushless motor commutation track output.
22	FRM GND	Motor common ground
23	MTR ØA	Motor Phase A
24	MTR ØB	Motor Phase B
25	MTR ØC	Motor Phase C

3.7. Vacuum Operation

Please contact the factory for information regarding operation in a vacuum environment.

Chapter 4: Maintenance

This chapter will cover information about intervals between lubrications, detail the lubrication and inspection process, and cover which lubricants are recommended for use.

NOTE: The bearing area must be kept free of foreign matter and moisture; otherwise, the performance and life expectancy of the stage will be reduced.

To minimize the possibility of bodily injury, confirm that all electrical power is disconnected prior to making any mechanical adjustments.

4.1. Service and Inspection Schedule

Lubricant inspection and replenishment in ANT-LX series stages depends on conditions such as duty cycle, speed, and the environment. An inspection interval of once per month is recommended until a trend develops for the application. Longer or shorter intervals may be required to maintain the film of lubricant on the bearing surfaces. In general, it is recommended that stages operating in a clean environment be lubricated annually, or 500 km, whichever comes first. For stages operating under conditions involving excessive debris, lubrication every six months is recommended. If the application process uses only a small portion of travel for most of the duty cycle, it is recommended that the stage be periodically driven through full travel to redistribute the lubrication in the bearings. The motor is completely non-contact and requires no lubrication.

4.2. Cleaning and Lubrication

4.2.1. Recommended Lubricants and Cleaners

For standard linear roller bearings, NSK LGU grease is recommended.

For high-speed applications (i.e., near maximum speed at a duty cycle of 50%), frequent maintenance with standard lubricants is required.

4.2.2. Important Notes on Lubrication

When cleaning and/or lubricating components of the ANT-LX stages:

1. Be sure to use a clean, dry, soft, and lint–free cloth for cleaning.
2. Take the opportunity during the lubrication procedure to inspect the linear motion guides for any damage or signs of wear.
3. In applications that have multiple stages bolted together to form multi axis systems, the orthogonality may be lost if the stage tables of the support stages are loosened. Precision aligned stages should not be loosened or disassembled.

4.2.3. Lubrication and Cleaning Process

The lubrication and cleaning process is outlined in the steps that follow.

1. Drive the stage table to one end of travel and remove power to the stage.
2. Remove any accumulated dust or debris that is visible inside of the assembly.
3. Remove any dirty or dried lubricant from the v-channels of the bearing rails. Use a clean, lint-free cloth with a side-to-side motion. A swab soaked in isopropyl alcohol may be used to remove stubborn debris.
4. Apply a thin, continuous film of lubricant to exposed v-channels of the cross rollers on both ends of the stage. A good quality, natural bristle artist's brush makes an excellent applicator.
5. Manually move the stage to the opposite end of travel. This will work the grease into the linear bearing guides. The stage table should move freely with little resistance.
6. Repeat steps 3 through 5 for any areas covered by the original table position.
7. Restore power to the stage and drive the stage table back to its original position to redistribute lubricants.

To minimize the possibility of bodily injury, confirm that all electrical power is disconnected prior to making any mechanical adjustments.

Appendix A: Warranty and Field Service

Aerotech, Inc. warrants its products to be free from defects caused by faulty materials or poor workmanship for a minimum period of one year from date of shipment from Aerotech. Aerotech's liability is limited to replacing, repairing or issuing credit, at its option, for any products that are returned by the original purchaser during the warranty period. Aerotech makes no warranty that its products are fit for the use or purpose to which they may be put by the buyer, where or not such use or purpose has been disclosed to Aerotech in specifications or drawings previously or subsequently provided, or whether or not Aerotech's products are specifically designed and/or manufactured for buyer's use or purpose. Aerotech's liability or any claim for loss or damage arising out of the sale, resale or use of any of its products shall in no event exceed the selling price of the unit.

Laser Products

Aerotech, Inc. warrants its laser products to the original purchaser for a minimum period of one year from date of shipment. This warranty covers defects in workmanship and material and is voided for all laser power supplies, plasma tubes and laser systems subject to electrical or physical abuse, tampering (such as opening the housing or removal of the serial tag) or improper operation as determined by Aerotech. This warranty is also voided for failure to comply with Aerotech's return procedures.

Return Procedure

Claims for shipment damage (evident or concealed) must be filed with the carrier by the buyer. Aerotech must be notified within (30) days of shipment of incorrect materials. No product may be returned, whether in warranty or out of warranty, without first obtaining approval from Aerotech. No credit will be given nor repairs made for products returned without such approval. Any returned product(s) must be accompanied by a return authorization number. The return authorization number may be obtained by calling an Aerotech service center. Products must be returned, prepaid, to an Aerotech service center (no C.O.D. or Collect Freight accepted). The status of any product returned later than (30) days after the issuance of a return authorization number will be subject to review.

Returned Product Warranty Determination

After Aerotech's examination, warranty or out-of-warranty status will be determined. If upon Aerotech's examination a warranted defect exists, then the product(s) will be repaired at no charge and shipped, prepaid, back to the buyer. If the buyer desires an airfreight return, the product(s) will be shipped collect. Warranty repairs do not extend the original warranty period.

Returned Product Non-warranty Determination

After Aerotech's examination, the buyer shall be notified of the repair cost. At such time, the buyer must issue a valid purchase order to cover the cost of the repair and freight, or authorize the product(s) to be shipped back as is, at the buyer's expense. Failure to obtain a purchase order number or approval within (30) days of notification will result in the product(s) being returned as is, at the buyer's expense. Repair work is warranted for (90) days from date of shipment. Replacement components are warranted for one year from date of shipment.

Rush Service

At times, the buyer may desire to expedite a repair. Regardless of warranty or out-of-warranty status, the buyer must issue a valid purchase order to cover the added rush service cost. Rush service is subject to Aerotech's approval.

On-site Warranty Repair

If an Aerotech product cannot be made functional by telephone assistance or by sending and having the customer install replacement parts, and cannot be returned to the Aerotech service center for repair, and if Aerotech determines the problem could be warranty-related, then the following policy applies:

Aerotech will provide an on-site field service representative in a reasonable amount of time, provided that the customer issues a valid purchase order to Aerotech covering all transportation and subsistence costs. For warranty field repairs, the customer will not be charged for the cost of labor and material. If service is rendered at times other than normal work periods, then special service rates apply.

If during the on-site repair it is determined the problem is not warranty related, then the terms and conditions stated in the following "On-Site Non-Warranty Repair" section apply.

On-site Non-warranty Repair

If any Aerotech product cannot be made functional by telephone assistance or purchased replacement parts, and cannot be returned to the Aerotech service center for repair, then the following field service policy applies:

Aerotech will provide an on-site field service representative in a reasonable amount of time, provided that the customer issues a valid purchase order to Aerotech covering all transportation and subsistence costs and the prevailing labor cost, including travel time, necessary to complete the repair.

Company Address

Aerotech, Inc.
101 Zeta Drive
Pittsburgh, PA
15238-2897

Phone: (412) 963-7470

Fax: (412) 963-7459

Appendix B: Technical Changes

Table B-1: Current Changes (1.02.00)

Section(s) Affected	General Information
Section 1.4.	Added section
Section 3.1.	Added section
Chapter 2: Installation, Section 2.3. , Section 2.5. , and Section 1.3.	Added safety information and warnings
Section 3.6.	Added note about current requirements of motor and ground wires

Table B-2: Archived Changes

Revision	Section(s) Affected	General Information
1.01.00	Section 1.2.	Added Dimensions section
1.00.00	--	New Manual

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Reader's Comments

ANT-LX Series Stage Manual **P/N: EDS128, November 5, 2010** **Revision 1.02.00** Please answer the questions below and add any suggestions for improving this document.	

Is the manual:	Yes	No
Adequate to the subject		
Well organized		
Clearly presented		
Well illustrated		

How do you use this document in your job? Does it meet your needs? What improvements, if any, would you like to see? Please be specific or cite examples.

	Stage/Product Details		Name	
Model #			Title	
Serial #			Company Name	
Date Shipped			Address	
Customer Order #				
Aerotech Subsidiary Order #			Email	

Mail your comments to:	**Fax to:**
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